

### ■ General Description

The MST1661 is a monolithic device intended for building a complete flashing unit for two wheel vehicles. The device is connected between the battery positive terminal (VCC pin) and a mechanical switch to the right and/or left bulbs. As soon as the series switch connects the OUT pin to the bulbs, the device begins to turn on/off with a 50% duty cycle. An external capacitor connected between the CEXT pin and the OUT pin stores energy for powering the device during the ON phase. When a low load is detected (output current lower than  $I_{df}$ ), flashing frequency is automatically doubled.

### ■ Features

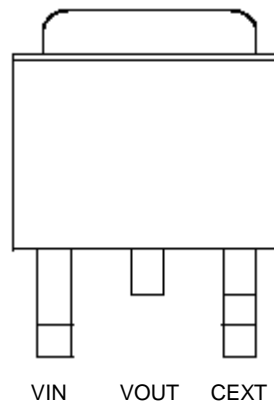
- Complete direction indicator in a 3 pin package
- Double frequency flashing in low load conditions
- Cycle by cycle over temperature shutdown
- Break down voltage up to 51V
- On chip oscillator ensures stable flashing frequency
- Over current protection
- Thermal shutdown protection
- On resistance as low as 60 mohm typical

### ■ Pin Descriptions

Number	Symbol	Description
1	VIN	Battery positive terminal
2	VOUT	Output terminal
3	CEXT	Capacitor terminal

### ■ Pin Configuration

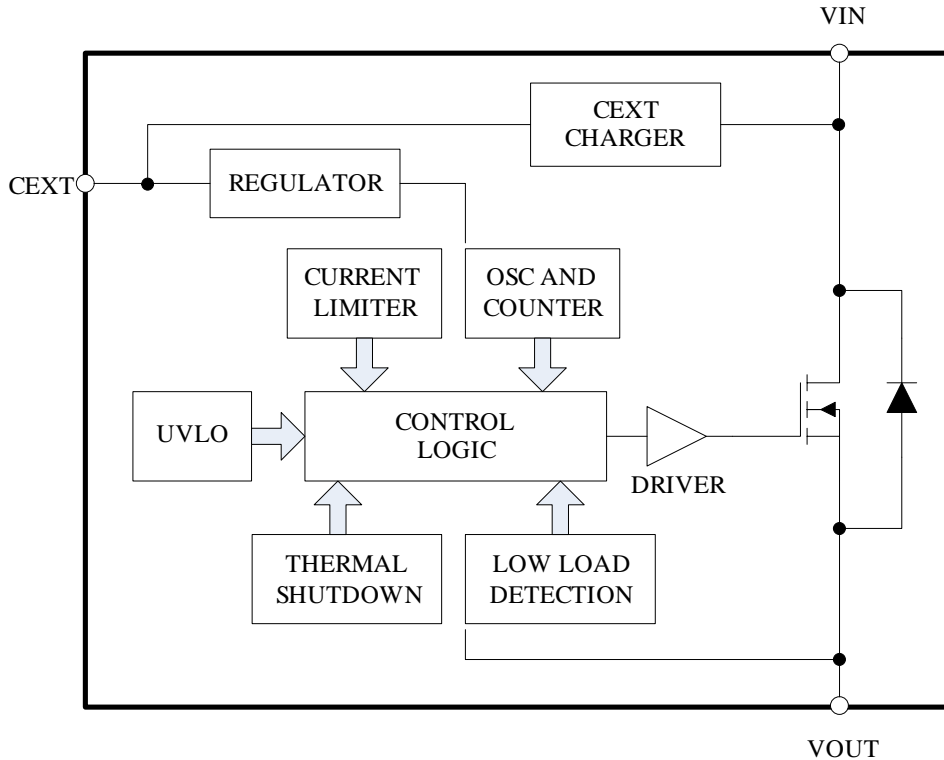
TO252



## Ordering Information

Part Number	Package	Description	Marking	Packing Minimum
MST1661	TO252	16W+16W+3W	MST1661	2500pcs

## Block Diagram



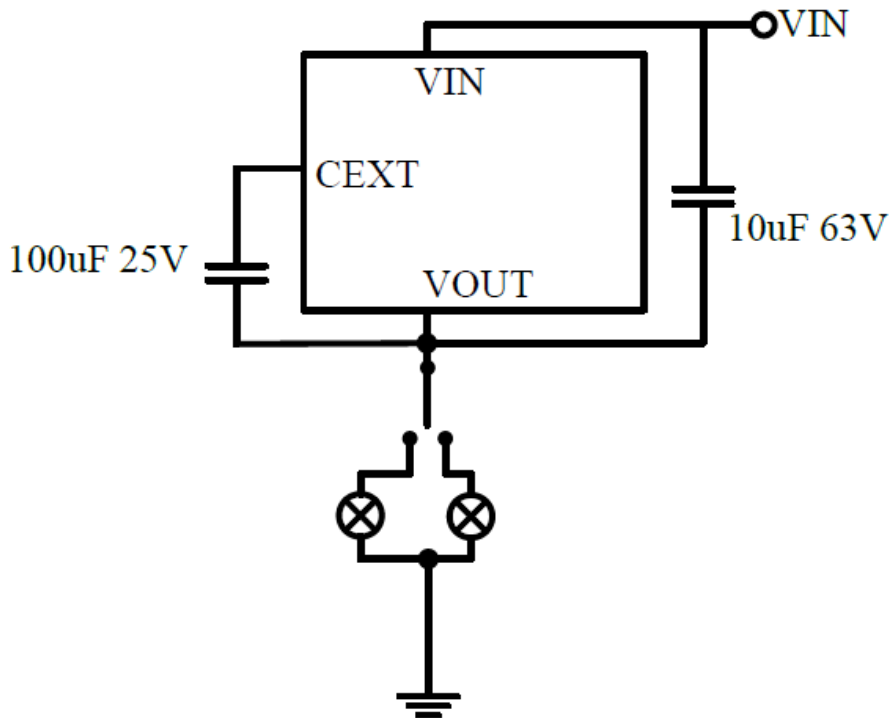
## Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V <sub>in</sub>	DC Supply Voltage	40	V
V <sub>dd</sub>	CEXT Capacitor Voltage	20	V
I <sub>peak</sub>	Maximum DC Drain Current (T <sub>c</sub> =25°C, V <sub>in</sub> =12V)	Internally Limited	A
V <sub>esd</sub>	Electrostatic Discharge (Human Body Mode)	2000	V
	Electrostatic Discharge (Machine Mode)	200	V
PL	Power Dissipation (T <sub>c</sub> =25 °C)	55	W
T <sub>j</sub>	Junction Operating Temperature	Internally Limited	°C
T <sub>stg</sub>	Storage Temperature	-40-150	°C
R <sub>thj-t</sub>	Thermal Resistance Junction-top	3.33	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient	45	°C/W

■ **Electrical Characteristics** (VIN=12V, TC=25 °C unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
DC Supply Voltage	Vin		9		24	V
Under voltage Lockout Threshold	Vdd <sub>NORM</sub>	VCEXT rising	6.3	6.5	6.7	V
Under voltage Lockout Hysteresis	Vdd <sub>UVLO</sub>	VCEXT falling	1.4	1.5	1.7	V
On State Resistance	RDS(ON)	Vdd=5V;Ic =1.6A		60	80	mΩ
Oscillating Frequency	Focs		1.33	1.42	1.5	Hz
Drain Current Limit	Ilim	Rload<100mΩ		15		A
Overtemperature Shutdown	Tjsh		125	140		°C
Overtemperature Reset	Tjrs		100	115		°C
Turn-on Current Slope	dI/dt(on)	Rload=8Ω		0.02		A/us
Turn-off Current Slope	dI/dt(off)	Rload=8Ω		0.02		A/us
<b>MST1661</b> Double Frequency Flashing Threshold	I <sub>DF1</sub>	Vin=9V	1.55	1.71	1.87	A
<b>MST1661</b> Double Frequency Flashing Threshold	I <sub>DF2</sub>	Vin=12V	1.79	1.98	2.18	A
<b>MST1661</b> Double Frequency Flashing Threshold	I <sub>DF3</sub>	Vin=15V	1.97	2.2	2.42	A

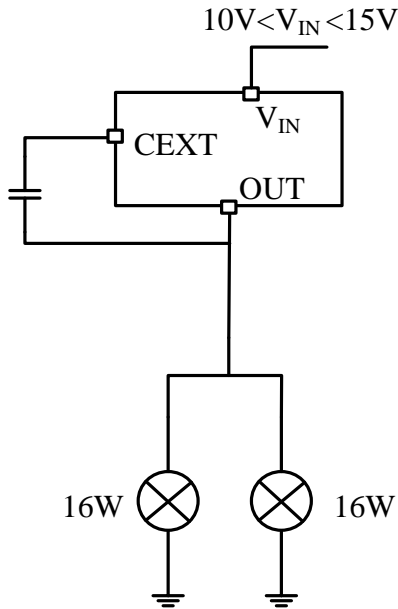
■ **Typical Application Circuit**



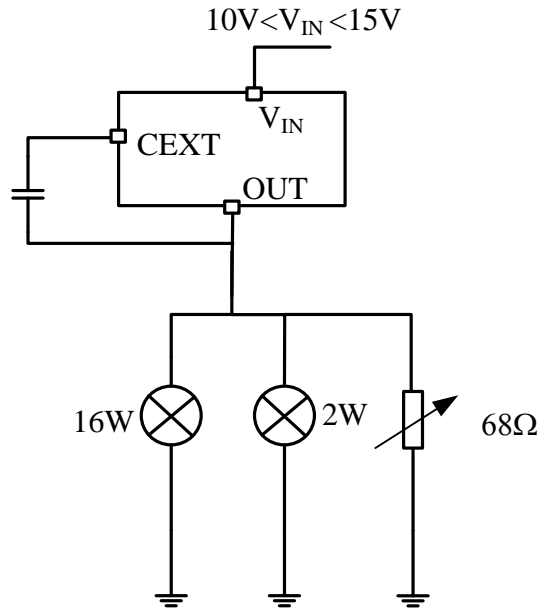
**MST1661 Typical Application Circuit**

## Application Information

### DOUBLE FREQUENCY TEST CONFIGURATION



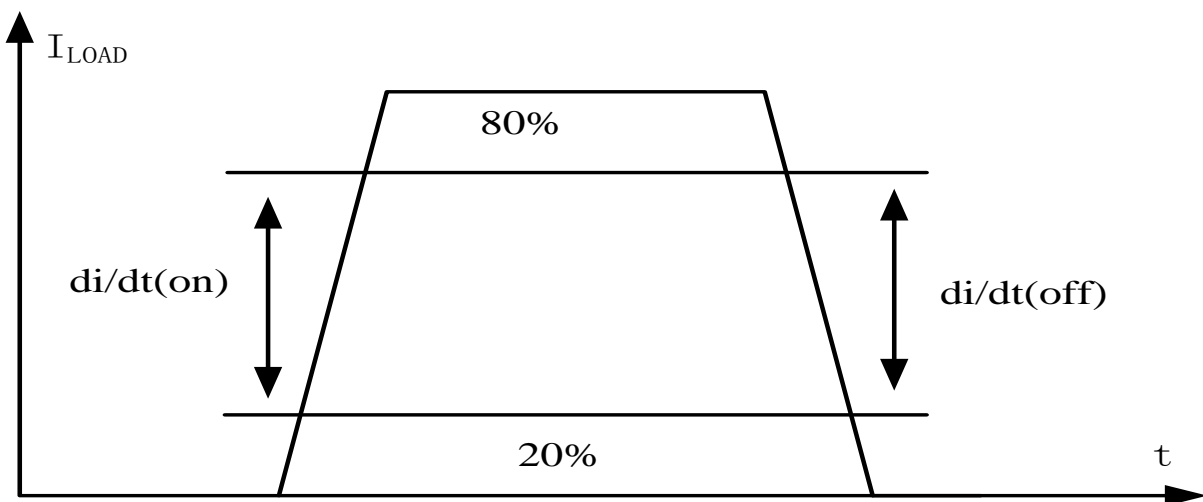
Test1: no defect, minimum load.  
The MST1661 must oscillate at  $f=F_{OSC}$ .



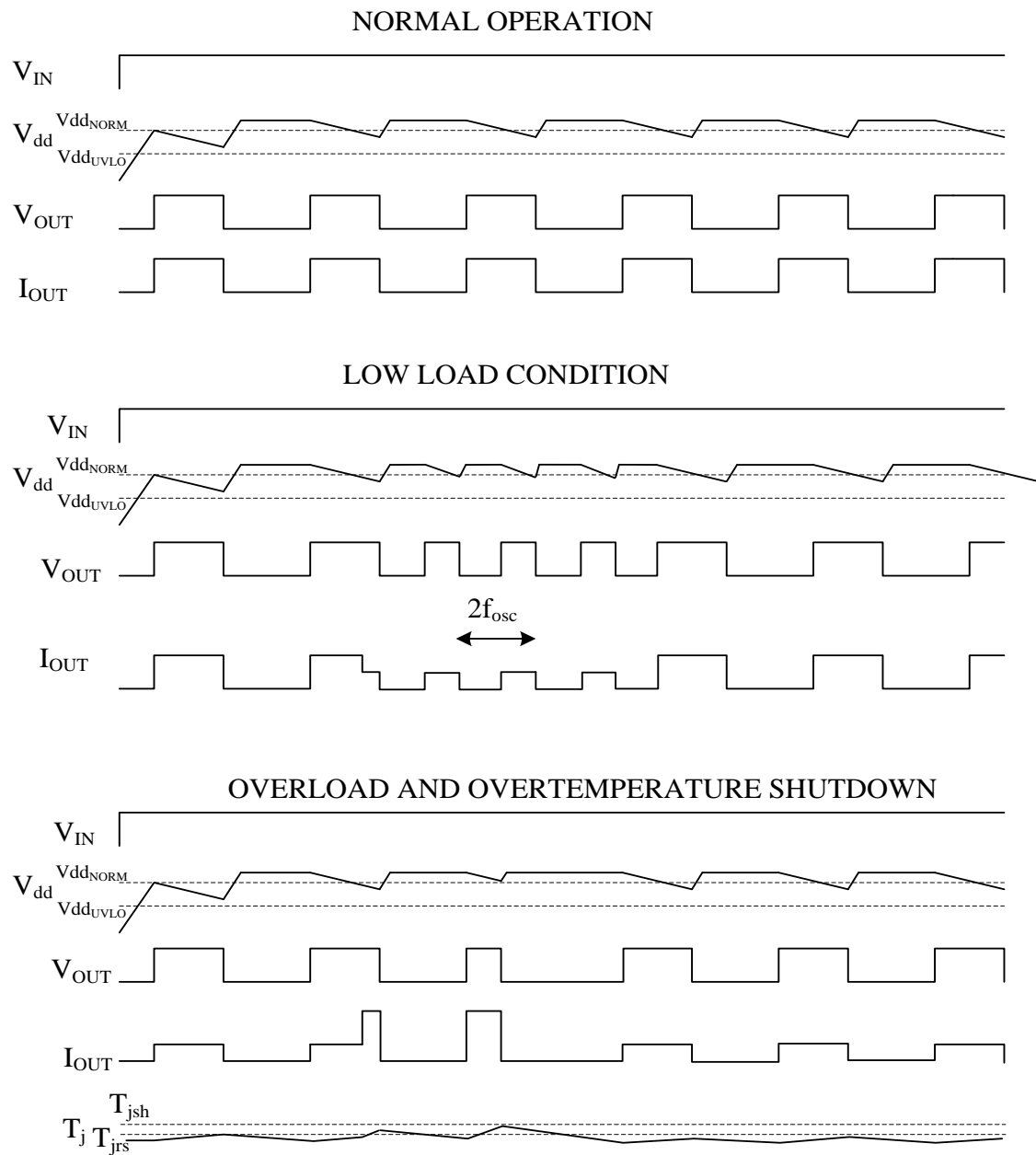
Test2: defect, maximum load.  
The MST1661 must oscillate at  $f=2F_{osc}$

## Typical Performance Characteristics

### SWITCHING CHARACTERISTICS

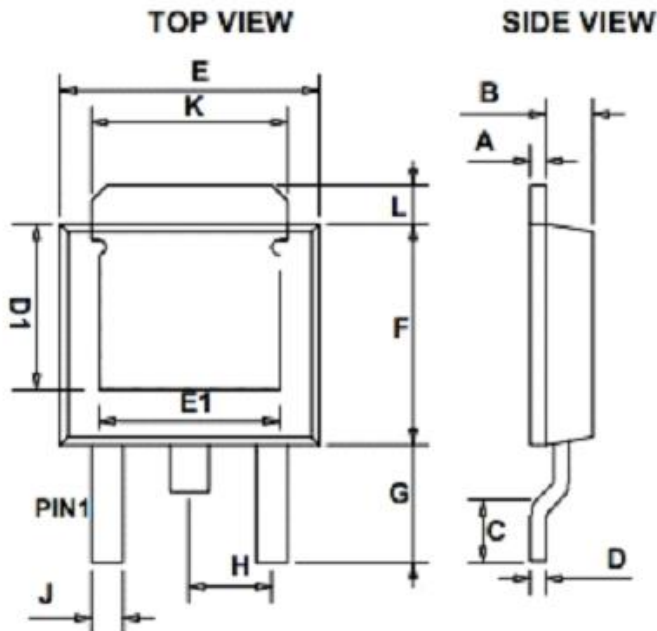


## Waveforms



■ Package Information

TO-252



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.43	0.58	0.0169	0.0230
B	1.60	1.95	0.0630	0.0768
C	0.51	1.78	0.0200	0.0701
D	0.43	0.60	0.0169	0.0236
E	6.35	6.80	0.2500	0.2677
F	5.36	6.22	0.2110	0.2450
G	2.20	3.00	0.0866	0.1181
H	-	* 2.30	-	*0.0906
J	0.50	0.97	0.0197	0.0380
K	5.20	5.50	0.2047	0.2165
L	1.35	1.65	0.0531	0.0650
D1	3.80 REF		0.1496 REF	
E1	3.81	5.10	0.1500	0.2008

\*:Typical Value  
 Notes:  
 1. Controlling dimension: Millimeters.  
 2. Maximum lead thickness includes lead finish thickness Minimum lead thickness is the minimum thickness of base material.

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